REMARKS

Claims 1-57 are pending in the application.

Claims 1-57 stand rejected.

Claims 1 and 30 have been amended.

Rejection of Claims under 35 U.S.C. §101

Claims 1-54 stand rejected under 35 U.S.C. §101 as being directed to non-statutory matter. Claims 1 and 30 have been amended to address the Examiner's concerns.

Rejection of Claims under 35 U.S.C. §103

Claims 1-15, 30-44 and 55-57 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Jones et al., U.S. Patent No. 5,812,844 (Jones). Applicants respectfully traverse this rejection.

Applicants submit that the claimed invention is not obvious in light of Jones because a prima facie case of obviousness has not been established. Jones fails to provide at least two of the elements required to establish prima facie obviousness: "[T]he prior art reference ... must teach or suggest all the claim limitations" and "there must be some suggestion or motivation...to modify the reference." (MPEP 706.02[j]).

First, Applicants submit that Jones does not teach or suggest all the limitations of claim 1. For example, Jones does not show, teach or suggest "an element-specific selection adjustment." In paragraph 8(d), the Office action states that various teachings of Jones suggest "an element specific selection." Applicants note that the Office action leaves out the term "adjustment" in

the aforementioned rejection. The MPEP states that "all words in a claim must be considered in judging the patentability of that claim against the prior art." (§2103.43). Therefore, Applicants regard the exclusion of the term "adjustment" as a typographical error and respond to the Office action's rejection of claim 1 as though it stated "element-specific selection adjustment."

The Office action states that the following steps of Jones suggest an "element-specific selection adjustment":

"a scheduler recalculates the restart time for the thread on the processor list,"

"moves the thread on the processor list to the ready list," and

"moves the thread having the earliest restart time on the ready list to the processor list."

The two steps that involve moving the thread might suggest actions that are a part of the claimed invention's step of "assigning one of said plurality of elements to use said resource." However, those steps (the moving the thread steps) do not in any way suggest the use of an "element-specific selection adjustment" to determine which thread is selected. With respect to the step that includes "recalculating the restart time", the following discussion demonstrates that Jones' disclosure regarding "recalculating the restart time" does not show, teach or suggest "an element-specific selection adjustment."

Jones describes two techniques for recalculating the restart times. (column 11, lines 50-67). According to the first technique, Jones increments the restart time by the execution time of the thread (time executed). In the second technique, Jones increments the restart time by "time executed/CPU reservation," which can be represented by the equation:

$$\text{restart\_time} \leftarrow \text{restart\_time} + \frac{\text{time\_executed}}{\text{CPU\_reservation}}$$

A similar equation, according to one embodiment of claim 1, can be implemented to update an element's "measure-of-use." In this particular embodiment, the "period-of-use" is a thread's quantum of execution and the "measure-of-use adjustment" is the weight of the thread. (specification, pages 12, lines 12-15). Claim 1 recites that the "measure-of-use" is updated responsive to a "period-of-use" and a "measure-of-use adjustment." The specification, on page 21, illustrates the aforementioned embodiment of claim 1 by showing how actual virtual time (measure-of-use) is updated according to an equation that includes a quantum of execution (period-of-use) and a weight of the thread (measure-of-use adjustment):

$$\text{actual\_virtual\_time} \leftarrow \text{actual\_virtual\_time} + \frac{\text{quantum\_of\_execution}}{\text{weight\_of\_thread}}$$

Applicants note that scheduling a resource, as recited in claim 1, is responsive to more than just the actual virtual time (measure-of-use). The claimed invention assigns an element to a resource responsive to the element's "measure-of-use" *and* "element-specific selection adjustment," while Jones uses only the re-start time in selecting a thread. Even if a parallel could be drawn between Jones' "restart time" and the claimed invention's "measure of use," no such parallel can be drawn to the "element specific selection adjustment" of the claimed invention because Jones fails to disclose any such adjustment. Jones could not be expected to implement an "element-specific selection adjustment" to select a thread because none of the features of Jones' technique show, teach or suggest an element-specific selection adjustment. In fact, as described subsequently, Jones fails to recognize a need to implement an "element-specific selection adjustment" because Jones focuses on efficiently allocating the processor to a thread through the use of timer interrupts.

Jones' failure to disclose an "element-specific selection adjustment" is illustrated in Table 1. Table 1 shows a comparison between Jones' technique for selecting a thread and the corresponding limitations of claim 1. Applicants note that, because Jones' "time executed" and "CPU reservation" are comparable to the "period-of-use" and "measure-of-use adjustment" of the claimed invention, there are no remaining features of Jones to compare to an "element-specific selection adjustment."

Claim 1	Jones
updating a measure-of-use responsive to	incrementing a restart time according to
period-of-use	time executed
measure-of-use adjustment	CPU reservation
assigning one of said plurality of elements responsive to	selecting the thread having the
measure-of-use, and	earliest restart time
element-specific selection adjustment	

Table 1

In response to the first Office action, Applicants submitted that Jones does not show, teach or suggest an element-specific selection adjustment. (Response to non-final office action, page 19, lines 1-2). In reply, the Final Office action states, "the aforementioned claim elements are clearly subject to a broad interpretation, as detailed in the rejections maintained above. The Examiner has a duty and responsibility to the public and to the Applicant to interpret the claims as broadly as possible during prosecution." However, even under the broadest possible interpretation, Jones fails to suggest an "element-specific selection adjustment." This is because Jones only discloses two variables to use in selecting a thread ("time executed" and "CPU reservation"), while claim 1 claims three variables (the third variable being the "element-specific selection adjustment.") Furthermore, Jones' "time executed" and "CPU reservation" do not

suggest an "element-specific selection adjustment." Therefore, claim 1 clearly distinguishes over Jones, even when the claims are subject to the broadest possible interpretation.

Even if Jones did suggest the availability of an "element-specific selection adjustment," which Applicants maintain Jones fails to do, Jones fails to provide any motivation to modify the reference to provide an "element-specific selection adjustment." The Office action states "it would have been obvious to one of ordinary skill in the art to have applied the teachings of Jones for the assigning step in order to provide a means for *efficiently allocating the processor to a thread for the appropriate amount of time without having to interrupt the schedule.*" (emphasis added). The Office action is correct in suggesting that Jones is motivated to find a way to "efficiently allocat[e] the processor to a thread for the appropriate amount of time without having to interrupt the schedule." Indeed, on column 3, lines 25-35, Jones states, "This aspect of the invention [timer interrupts] minimizes the processor time spent scheduling the processor, or 'scheduling latency,' as the facility may efficiently allocate the processor to a thread for the appropriate amount of time without having to interrupt the thread to reevaluate the schedule." (column 3, lines 25-35). However, as the foregoing citation demonstrates, Jones already solves the problem of "allocating the processor to a thread for the appropriate amount of time without having to interrupt the schedule" by implementing timer interrupts.

Nothing in Jones suggests the need to look for a different or better solution to "efficiently allocate the processor to a thread...without having to interrupt the thread." In fact, one of ordinary skill in the art would not find any motivation to use an "element-specific selection adjustment" to improve or replace the timer interrupt functionality of Jones because it is unclear how an "element-specific selection adjustment" could improve or replace a timer interrupt.

Further, by reciting the limitation of assigning an element to a resource responsive to "an element-specific selection adjustment" and a "measure-of-use" (which is responsive to a "period-of-use" and a "measure-of-use adjustment"), the claimed invention adds at least one variable to the equation disclosed by Jones. On the other hand, Jones teaches that a thread is selected based on "time executed" and a "CPU reservation," and then discloses that a thread can alternatively be selected based only on "time executed." Thus, instead of suggesting the use of an additional variable, such as an "element-specific selection adjustment," Jones suggests dropping a variable from the equation. In conclusion, instead of suggesting the use an "element-specific selection adjustment," Jones actually teaches away from using an "element-specific selection adjustment."

Applicants respectfully submit that Jones fails to teach or suggest all of the claim limitations of claim 1. Furthermore, Applicants submit that there is no suggestion or motivation to modify Jones to provide the limitations of claim 1. Applicants therefore respectfully submit that claim 1 clearly distinguishes over Jones, taken alone or in permissible combination with the relevant skill in the art. Applicants submit that these arguments apply with equal force to independent claims 1, 30 and 55. Therefore, Applicants respectfully submit that independent claims 1, 30 and 55, as well as claims 2-29, 30-54 and 56-57, which depend on claims 1, 30 and 55, are allowable for at least the foregoing reasons. Applicants respectfully request withdrawal of the rejections based upon 35 U.S.C. §103(a). Accordingly, Applicants respectfully submit that claims 1-57 are in condition for allowance.

Rejection of Claims under 35 U.S.C. §103: Jones in view of Chow

Claims 16-29 and 45-54 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Jones et al., U.S. Patent No. 5,812,844 (Jones) in view of Chow et al., U.S. Patent No. 6,438,134 (Chow). Applicants respectfully traverse this rejection.

With respect to the references cited, Applicants respectfully submit that Jones, in view of Chow, fails to show, teach or suggest the limitations of claim 16. As mentioned in the Office Action, Jones does not teach that "the plurality of elements is a plurality of queues and said resource is bandwidth of an output port of a data switch." Furthermore, as previously discussed, Jones does not teach "assigning one of said plurality of elements to use said resource for a second period of use responsive to said measure-of-use and an element-specific selection adjustment for each element in said plurality of elements."

Chow does not remedy either of these deficiencies of Jones to provide the limitations of claim 16. First, in column 3, lines 16-47 Chow discloses a resource that is idle bandwidth allocated to a queue. However, Chow does not teach that the resource is the bandwidth of an *output port of a data switch*, as claimed in claim 16. Second, in column 3, lines 16-47 Chow does not show, teach or suggest assigning one of said plurality of elements to use said resource for a second period of use responsive to even a measure of use. In conclusion, both Jones and Chow fail to show, teach or suggest the following two limitations of claim 16: (1) the plurality of elements is a plurality of queues and said resource is bandwidth of an output port of a data switch and (2) assigning one of said plurality of elements to use said resource for a second period of use responsive to said measure-of-use and an element-specific selection adjustment for each element in said plurality of elements.

Furthermore, neither Jones nor Chow provides any motivation to combine their disclosures to provide any advantages over either reference taken separately. This is likely due, at least in part, to how Jones and Chow address different problems in different systems. Chow solves the problem of sub-optimal idle bandwidth distribution by decoupling the instantaneous idle bandwidth of a queue from the allocated service rate of the queue. (column 3, lines 17-34). Jones solves problems related to device interrupt handling by using time specific scheduling constraints to limit the amount of time a thread can execute. (column 2, lines 25-40).

Jones provides no motivation to look to Chow to provide better time specific scheduling constraints because Chow focuses on a handling idle bandwidth, and the principles taught by Chow would not provide any advantages to a system for providing time specific scheduling constraints. Chow provides no motivation to look to Jones to provide improved handling of idle bandwidth because putting time specific scheduling constraints on bandwidth allocation would not provide any further advantages to Chow's system. In conclusion, neither Jones nor Chow provides any motivation to combine their references to provide additional advantages over either reference taken separately; therefore, neither reference provides any motivation to combine their references to provide the advantages of the present invention, such as using an element specific selection adjustment to fairly allocate an element to a resource.

Applicants respectfully submit that claim 16 clearly distinguishes over Jones, taken alone or in permissible combination with Chow. Applicants submit that these arguments apply with equal force to claim 45. Applicants therefore respectfully submit that claims 16 and 45, as well as claims 17-29 and 46-54, which depend on claims 16 and 45, are allowable for at least the foregoing reasons.

CONCLUSION

In view of the amendments and remarks set forth herein, the application is believed to be in condition for allowance and a notice to that effect is solicited. Nonetheless, should any issues remain that might be subject to resolution through a telephonic interview, the Examiner is invited to telephone the undersigned at 512-439-5084.

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on February 10, 2005.

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